CLAIMS:

13. A peptide having the amino acid sequence

X01-X02-X03-G-X04-X05-X06-X07-X08-X09-W-X10-X11-X12

wherein

X01 = amino group, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X02 = D,G,E,T, S or deletion;

X03 = W,Y,F,G,T;

X04 = T,S,A,G;

X05 = L,F,Y,W;

X06 = V,I,W,F,Y;

X07 = S,A,C;

X08 = G,D,E,N,Q;

X09 = F,L,I,Y;

X10 = E,Q,T,S,L;

X11 = Y,F,T,S,W;

X12 = amide, the free acid, GKK, or a spacer;

and peptides having the amino acid sequence

X01-X02-W-X03-R-X04-X05-X06-X07-X08-E-A-R-X09-X10-X11-X12-X13-X14-X15-X16-X17

wherein

X01 = amino group, amino acid, peptide, acetyl group, biotin group,

fluorescent label, spacer, linker or deletion;

X02 = H, E, Q;

X03 = H, F, Y, W;

X04 = A, V;

X05 = G, T, E, S, D, N;

X06 = S, H, A;

X07 = D, N ,Q, E;

X08 = G, A, or a deletion;

X09 = D, N, R;

X10 = S, T, C, M;

X11 = H F, W, Y;

X12 = A, D, N, S;

X13 = D, N;

X14 = E, P;

X15 = R, K, T;

X16 = S, T, C, M or a deletion;

X17 = amide, the free acid, GKK, SGKK or a spacer.

14. The peptide according to claim 13 having the following amino acid sequence:

X01-X02-X03-G-X04-X05-X06-X07-X08-X09-W-X10-X11-X12

wherein

X01 = amino group, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X02 = D,E,T, or deletion;

X03 = W,Y,T;

X04 = T,S;

X05 = L,F;

X06 = V,F;

X07 = S;

X08 = G,D,E;

X09 = F,L;

X10 = E,Q,T,L;

X11 = Y,T,S;

X12 = amid, the free acid, GKK, or a spacer;

and peptides having the amino acid sequence

X01-H-W-X03-R-A-X05-S-D-X08-E-A-R-R-S-Y-X12-D-P-X15-X16-X17

wherein

X01 = amino group, amino acid, peptide, acetyl group, biotin group, fluorescent label, spacer, linker or deletion;

X03 = Y, W;

X05 = T, E;

X08 = G, or a deletion;

X12 = A, N;

X15 = K, T;

X16 = S, or a deletion;

X17 = amide, the free acid, GKK, SGKK or a spacer.

15. The peptides according to claim 13 selected from the group consisting of:

-TGSFFSELWTSR[2],
EYGSFFSELWTSR[2],

TYGTLFSDFWLSR^2,
DWGTLVSGFWEYR^2,
DWGTLFSDFWQTR^2,

wherein R^2 is an acid amide, a free acid or GKKR^3, and wherein R^3 is an acid amide or a free acid;

with the proviso that a maximum of one non-conservative amino acid exchange is effected per amino acid position in the sequence, wherein "non-conservative exchange" means an exchange of amino acids between the groups mentioned below:

Group I: Leu, Ile, Val, Met, His, Trp, Tyr, Phe,

Group II: Glu, Gln, Asp, Asn,

Group III: Ser, Thr, Cys, Gly, Ala, Pro,

Group IV: Lys, Arg;

and

peptides selected from the group consisting of:

HWWRAESD-EARRSYNDPK-R^2,
HWYRATSDGEARRSYADPTSR^2,

with the proviso that a maximum of two non-conservative amino acid exchanges are effected per amino acid position in the sequence, wherein "non-conservative exchange" means an exchange of amino acids between the groups mentioned below:

Group I: Leu, Ile, Val, Met, His, Trp, Tyr, Phe,

Group II: Glu, Gln, Asp, Asn,

Group III: Ser, Thr, Cys, Gly, Ala, Pro,

Group IV: Lys, Arg.

TYGTLFSDFWLSR^2,
DWGTLVSGFWEYR^2,
DWGTLFSDFWQTR^2,

wherein R^2 is an acid amide, a free acid or GKKR^3, and wherein R^3 is an acid amide or a free acid;

with the proviso that a maximum of one non-conservative amino acid exchange is effected per amino acid position in the sequence, wherein "non-conservative exchange" means an exchange of amino acids between the groups mentioned below:

Group I: Leu, Ile, Val, Met, His, Trp, Tyr, Phe,

Group II: Glu, Gln, Asp, Asn;

Group III: Ser, Thr, Cys, Gly, Ala, Pro,

Group IV: Lys, Arg;

and

peptides selected from the group consisting of:

HWWRAESD-EARRSYNDPK-R^2,
HWYRATSDGEARRSYADPTSR^2,

with the proviso that a maximum of two non-conservative amino acid exchanges are effected per amino acid position in the sequence, wherein "non-conservative exchange" means an exchange of amino acids between the groups mentioned below:

Group I: Leu, Ile, Val, Met, His, Trp, Tyr, Phe,

Group II: Glu, Gln, Asp, Asn,

Group III: Ser, Thr, Cys, Gly, Ala, Pro,

Group IV: Lys, Arg.

16. The peptides according to claim 13, characterized by being:

TGSFF SELWT SGKK-amide or free acid,

E YGSFF SELWT SGKK-amide or free acid,

T YGTLF SDFWL SGKK-amide or free acid,

His-Trp-Trp-Arg-Ala-Glu-Ser-Asp-Glu-Ala-Arg-Arg-Ser-Tyr-Asn-Asp-Pro-Lys-amide or free acid,

Ala-Arg-Arg-Cys-Tyr-Asn-Asp-Pro-Lys-amide or free acid,

D WGTLV SGFWE Y amide or free acid,

D WGTLF SDFWQ TGKK amide or free acid,

H WYRAT SDGEA RRSYA DPTSG KK-amide or free acid,

HWWRAESDEARRSYNDPKC-amide or free acid,

which may also be acetylated N-terminally.

17. The peptides according to claim 13, characterized by being bound by antibodies of patients suffering from dilatative cardiomyopathy.

18. The peptides according to claim 13, characterized in that said linker is selected from the group consisting of:

- α-aminocarboxylic acids and their homo- and heterooligomers;
- α,ω-aminocarboxylic acids and their branched homo- or heterooligomers;
- other amino acids and their linear and branched homo- or heterooligomers (peptides);
- amino-oligoalkoxy-alkylamines;
- maleinimidocarboxylic acid derivatives;
- oligomers of alkylamines;
- 4-alkylphenyl derivatives;
- 4-oligoalkoxyphenyl or 4–oligoalkoxyphenoxy derivatives;
- 4-oligoalkylmercaptophenyl or 4–oligoalkylmercaptophenoxy derivatives;

- 4-oligoalkylaminophenyl or 4-oligoalkylaminophenoxy derivatives;
- (oligoalkylbenzyl)phenyl or (4-oligoalkylbenzyl)phenoxy derivatives, and (4-oligoalkoxybenzyl)phenyl or (4-oligoalkoxybenzyl)phenoxy derivatives;
- trityl derivatives;
- benzyloxyaryl or benzyloxyalkyl derivatives;
- xanthene-3-yloxyalkyl derivatives;
- (4-alkylphenyl) or ω-(4-alkylphenoxy)alkanoic acid derivatives;
- oligoalkylphenoxyalkyl or oligoalkoxyphenoxyalkyl derivatives;
- carbamate derivatives;
- amines;
- trialkylsilyl or dialkylalkoxysilyl derivatives;
- alkyl or aryl derivatives;
- and combinations thereof.

19. The peptides according to claim 13, characterized by being bound to a solid phase.

20. The peptides according to claim 13, characterized by being bound to a solid phase through a spacer.

21. A medicament containing the peptides according to claim 13.

22. Use of the peptides according to claim 13 for the preparation of a medicament for treatment with diseases related to β_1-adrenergically active auto-antibodies, especially dilatative cardiomyopathy.

23. A method for treating diseases related to β_1-adrenergically active auto-antibodies by removing the auto-antibodies by means of peptides according to claim 18 bound to a solid phase.

24. A device for chromatography containing peptides according to claim 18 bound to a solid phase.